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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Shaul Branchevsky

Attorney Docket No.: NSC1P223/  
P04339P02

Patent: 6,778,058 B1

Issued: August 17, 2004

Title: EMBEDDED 3D COIL INDUCTORS IN A  
LOW TEMPERATURE, CO-FIRED CERAMIC  
SUBSTRATE

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on September 23, 2004 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria VA 22313-1450.

Signed:

*Aurelia M. Sanchez*  
Aurelia M. Sanchez

**REQUEST FOR CERTIFICATE OF CORRECTION  
OF OFFICE MISTAKE  
(35 U.S.C. §254, 37 CFR §1.322)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
Attn: Certificate of Correction

**Certificate  
SEP 30 2004  
of Correction**

Dear Sir:

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing. The errors together with the exact page and line number where they occur, and shown correctly in the application filed, are as follows:

**SPECIFICATION:**

1. Column 2, line 41, change "Technology Conferences" to --Technology Conference--. This appears correctly in the patent application as filed on page 3, line 23.

*SEP 30 2004*

Patentee hereby requests expedited issuance of the Certificate of Correction because the error lies with the Office and because the error is clearly disclosed in the records of the Office. As required for expedited issuance, enclosed is documentation that unequivocally supports the patentee's assertion without needing reference to the patent file wrapper.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. NSC1P223).

Respectfully submitted,  
BEYER WEAVER & THOMAS, LLP



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For standard capacitor configurations, the capacitance of a structure is determined according to the following formula:

C = (kA)/t , where k is the dielectric constant of the dielectric material, A is the overlapping area between the electrodes, and t is the thickness of the dielectric, as shown in FIG. 7. Note that in FIG. 7, the dielectric area A and the electrode area A are presumed to be the same, but in practice the dielectric is usually made larger to ensure that the electrode layers do not touch. Thus, by changing the dielectric material, the capacitance value may be changed. FIG. 6 illustrates an SLCC in which a different dielectric is used, in order to change the capacitance. Instead of using a dielectric paste, the dielectric may be formed from a high firing temperature ceramic tape (1100 - 1400° C). The high temperature tape 66 is fired separately, and then placed on the first electrode 72. The dielectric constant of the high temperature tape 66 is several orders of magnitude greater (k = 20 - 20,000) than the dielectric constant of the standard tape (k = 7 - 8) used to form the layers 62, 64. Standard tape 68,70 may be used around the dielectric to provide a constant thickness between the main layers 62, 64.

Two articles which discuss LTCC technology include "Characterization and Performance Prediction for Integral Capacitors in Low Temperature Co-Fired Ceramic Technology," Delaney et al., IEEE Transactions on Advanced Packaging, Vol. 22, No. 1, February 1999, pgs. 68 - 77; and "Characteristics of the Electrical Performance of Buried Capacitors and Resistors in Low Temperature Co-Fired (LTCC) Ceramic," Delaney et al., 1998 Electronic Components and Technology Conference, pgs. 900 - 908, the disclosures of which are herein incorporated by reference. While these articles seek to address the problem of providing capacitors with increased capacitance, the capacitors are still confined to being formed within a single layer of ceramic tape. The disclosed processes cannot make high capacitance capacitors and they require numerous types of dielectric materials in order to create different capacitances.

Since there is a practical limit to the dielectric constant that can be achieved, single layer capacitors do not provide sufficient capacitance within a reasonable area, for many applications. Thus, for high value capacitances, external capacitors are

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(Also Form PT-1050)

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,778,058 B1

DATED : August 17, 2004

INVENTOR(S) : Shaul Branchevsky

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

**In the Specifications:**

Column 2, line 41, change "Technology Conferences" to --Technology Conference--.

MAILING ADDRESS OF SENDER:

PATENT NO. 6,778,058 B1

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SEP 3 0 2004